Chapter 63
On Computerizing the Ancient Game of Ṭāb

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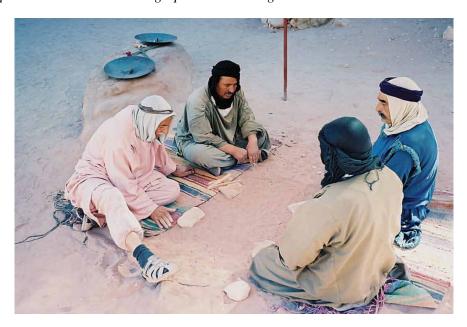*Cincinnati Children's Hospital Medical Center, Cincinnati, USA*

ABSTRACT

The ancient game of ṭāb is a war and race game. It is played by two teams, each consisting of at least one player. In addition to presenting the game and its rules, the authors develop three versions of the game: human versus human, human versus computer, and computer versus computer. The authors employ a Genetic Algorithm (GA) to help the computer to choose the 'best' move to play. The computer game is designed allowing two degrees of difficulty: Beginners and Advanced. The results of several experiments show the strategic properties of this game, the strength of the proposed method by making the computer play the game intelligently, and the potential of generalizing their approach to other similar games.

INTRODUCTION

The game of ṭāb (Arabic: طاب) is a board game, played by two teams, each of which consists of at least one player. It uses a game board of four rows of holes, which are normally impressed in the sand, with typically 8 to 12 holes per row. The rows of holes are used to host the players' pieces while playing. The pieces, also referred to here as soldiers, are moved based on the throws of four two-sided stick dice. The game ends by capturing all soldiers of the opponent and in this game a tie is not possible. Figure 1 shows two teams of two players enjoying the game of ṭāb in Petra, Jordan.

Figure 1. Two teams of two players playing the game of ṭāb in Petra. Four stick dice are used and the board is impressed in the sand. Photograph: Alex de Voogt 2009.

This game is one of the most popular board games in the Middle East and attested particularly in Jordan, Palestine, Sudan and some places in Egypt. The history of this game can be traced back to several hundred years. A recent survey of the archaeological region of Petra in Jordan revealed an unusually large number of ṭāb playing boards carved in rock surfaces distributed over two major sites in the ancient city (De Voogt, Hassanat, & Alhasanat, 2017). See Figure 2 for examples of these game boards. The survey study suggests a connection to the ancient city of Petra, but there was no evidence to date this game back to the Nabataeans (about 2000 years ago). The game has not been mentioned in Roman sources and no excavation has revealed such game boards even though several such game boards were found near archaeological sites. In addition, there is little evidence that can date the origin of the game of ṭāb to any specific period so that the birth date of the game of ṭāb remains elusive.

A nineteenth century description of this game is almost identical to what it is found today (Murray, 1952). Murray reports on sources that show that this game was played in Turkey, Egypt, and Persia, so that its presence in Jordan is not necessarily surprising. The majority of the ṭāb players in Jordan seem

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